5-2022

Analysis Of High Flow Nasal Cannula Utilization During Pediatric Critical Care Transport

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Objective

There are limited studies on the safety and efficacy of high flow nasal cannula (HFNC) utilization in pediatric critical care transport (CCT). This 15-month retrospective study was designed to describe HFNC utilization by our team and to track escalations in respiratory support within 24 hours of hospital admission including the need for increased liter flow, non-invasive ventilation, or intubation.

Methods

Retrospective charts were reviewed from January 1st, 2019, to March 31st, 2020, and screened for inclusion criteria:

1. >30 days and <18 years old
2. Required HFNC utilization at ≥4 liters/minute (L/min) during CCT
3. Admitted to our pediatric facility

A total of 6,279 transports were performed during the study period; 382 charts reviewed, and 358 patients met inclusion criteria. No new equipment was trialed during this study.

Results

N = 358 (5.7% of total transports)	Median	Interquartile Range (IQR)
Age (years)	0.7	0.3-1
Weight (kg)	8.4	6.2-11
Transport time (min)	80	69-115

Patient starting location tracked and compared to drop-off location.

Referral Patient Starting Location	Total (%)	Patient Drop-Off Location	Total (%)
Emergency Room	184 (51%)	Pediatric Floor	148 (41%)
Pediatric Floor (Peds)	119 (33%)	PICU	210 (59%)
Urgent Care	42 (12%)	*Peds floor HFNC criteria: <2 years of age, no comorbidities, suspected respiratory viral illness, max 2 L/kg and/or 15 L/min, ≤40% FiO2.*	
Pediatric Intensive Care Unit (PICU)	13 (4%)		

HFNC status tracked and differentiated between transport team initiation of the oxygen delivery device, weaned flow, or continued the current settings.

	Initiated By Transport, *n* = 79 (Median & [IQR] L/min)	Weaned By Transport, *n* = 42 (Median & [IQR] L/min)	Continued Referral Settings, *n* = 237 (Median & [IQR] L/min)	P-Value
Referral	---	10.0 [6.3, 15.0]	12.0 [8.0, 15.0]	0.052
Drop-Off	10.0 [8.0, 15.0]	10.0 [5.7, 12.0]	10.0 [8.0, 15.0]	0.122
2-Hrs Post Drop-off	10.0 [8.0, 12.8]	6.0 [2.7, 10.0]	10.0 [8.0, 13.0]	0.004
6-Hrs Post Drop-off	10.0 [8.0, 14.5]	10.0 [9.3, 10.5]	10.0 [6.0, 12.0]	0.314

Patients were tracked for 24 hours post drop-off for escalations in care.

Escalations of Care	Number (%)
Increase in flow	90 (76%)
Non-invasive ventilation	28 (24%)
Intubation	0 (0%)
Total #	118 (33% of our HFNC volume)

Conclusion

Our data suggests HFNC utilization during pediatric CCT is a safe modality for non-invasive oxygen delivery with minimal risk of escalation and no need for intubation. In the future, we plan to implement a HFNC protocol for management guidelines during CCT while conducting further research and review.

Discussion

We did not include SARS-COVID-19 patients in this study due to the initial variability in non-invasive respiratory support. The high number of escalations, particularly increased liter flow after patient drop-off, is likely due to institutional practice to start all Peds HFNC patients at 2 L/kg and/or max of 15 L/min.

References

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